

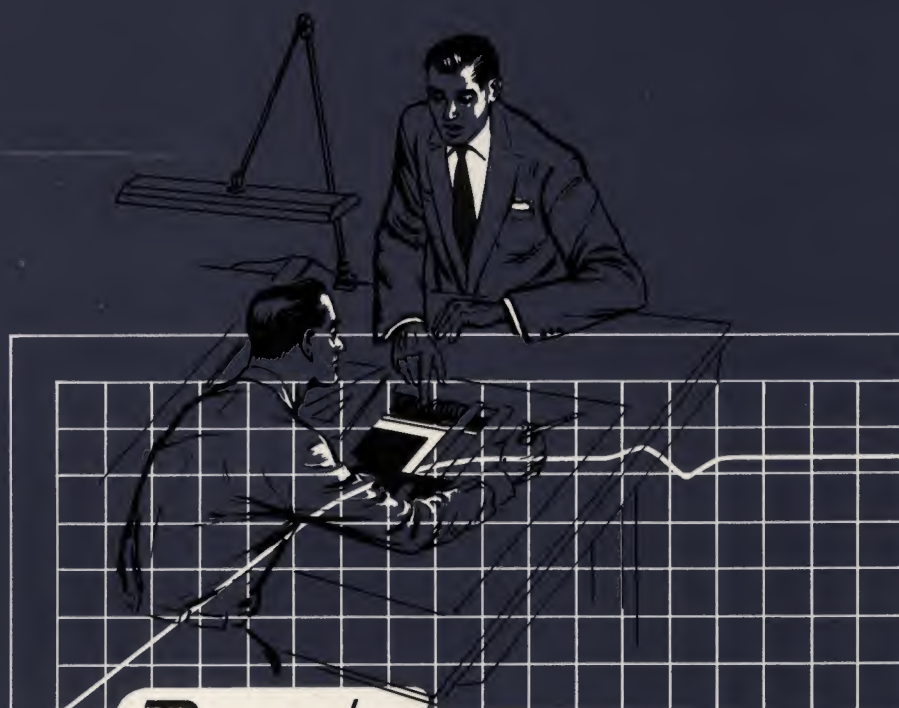
# APPLICATION *Engineered*

**GAS-FIRED  
HOT WATER**

# **HEATING BOILERS**

BY

*Raypak*



*Raypak*

**COMPANY, INC.**

Engineers-Manufacturers 2416 CHICO AVENUE, EL MONTE, CALIFORNIA

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# THE TREND IS TO HOT WATER CENTRAL HEATING FOR WHICH RAYPAK IS "application engineered".

This trend is due largely to the public demand for the true comfort, health, cleanliness, quietude of operation, uniformity and the efficiency found only in hot water central heating.

Hot water heating with Raypak overcomes the many objections to hot metal combustion elements of hot air furnaces in that it does not blast burned organic particles and air borne dust which in turn leave deposits on interior furnishings and equipment. Objectionable odors and clogged filters are no problem on a Raypak installation.



## BASEBOARD RADIATION

Baseboard radiation is among the many heating applications for which Raypak is superior in residential and commercial structures. This type of heating places the radiation and convected heat at the perimeter of the structure where it belongs and furnishes clean, healthy, quick responding heat while the cold outside walls and floor are warming — this cannot be done by the hot and cold blasts of a hot air heating system.

## RADIANT PANEL HEATING

Raypak plug-in packages were originally designed for this superior form of heating which uses copper coils imbedded in the floor or ceiling. This invisible system provides the optimum in clean, healthy warmth — no longer "the cold seventies." As a by-product of this type of heating, SNOW-MELTING may be accomplished automatically through the extension of the copper coils to walks and driveways. SNOW-MELTING may apply to new or existing structures with or without hot water central heating.

## CONVECTOR HEATING

This efficient system of heating replaces the outmoded cast iron radiator and adapts itself to the decor of the modern home. Convector heating is another type of hot water heating for which Raypak is "application engineered."

## AIR CONDITIONING

Engineers are drawing on the compatibility of chilled water air conditioning systems combined with hot water coils for year-round air conditioning because they know it is the finest system!

In systems where chilled water is used in connection with blower coil units the same coil may be used for hot water. The advantages of the combined system are obvious in that the "rough-in" cost of installation may be applied against both room cooling and heating. In systems employing direct expansion refrigerant, a separate set of hot water coils is simply incorporated at the original installation at low cost.

With hot water heating a high degree of temperature control is maintained. The above methods of combining air cooling and heating eliminate the design problems and space requirements of expensive insulated duct systems. Ordinary small diameter copper tubing may be conveniently threaded through the structure at any time during or after construction.

It is generally a fallacy to install a hot air system in the belief that it may later be converted to a cooling system as well. A hot air duct system per se is not adaptable to cooling applications. Cooled air requires larger ducts and insulated ducts — also greater CFM of air movement. Hot air register location is generally opposed to proper cooled air register location.

Raypak is the choice of air conditioning contractors and owners because the Raypak "Plug-In" is so ideally suited to cost-saving, compact, quality installations.

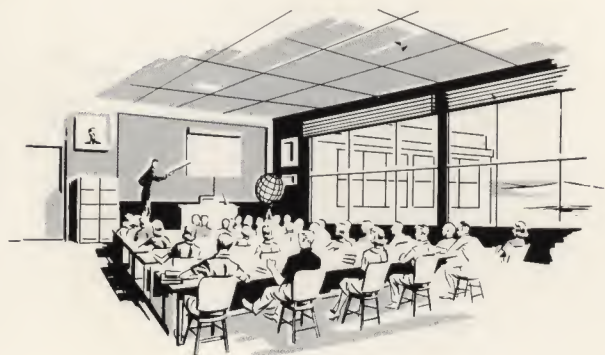
## INDUSTRIAL APPLICATIONS

As Raypak is superior in commercial and residential heating and air conditioning so is it outstanding in its various industrial uses such as in the curing of plastics and the heating of chemicals. Consult our engineering department for information concerning your industrial application.

## VOLUME SUPPLY

Unrivaled for restaurants, apartments and other commercial applications. Water of precise temperature is instantly ready through forced circulation. Control system provides water for disinfecting at 180°F. or higher. Eliminates problem of stratified water temperature characteristic of gravity type systems. May be installed in out-of-the-way location.

Raypak with its 100% rust-proof copper waterways cannot corrode, deteriorate, or discolor. Its rugged construction is tailor-made for heavy duty hot water service — space-saving, dependable, economical. Ordinarily it is used with a storage tank, which can be equipped with controls for dual-temp water supplies or a separate booster boiler used for 180° water with flow control and flow switch. See typical hookups, wiring and manifolding for multiple boiler installations on page 5. Expensive "down-time" is eliminated because of Raypak's easy on-the-job scale removal. Each tube of the heat exchanger is readily accessible thru its own bronze cleanout plug.





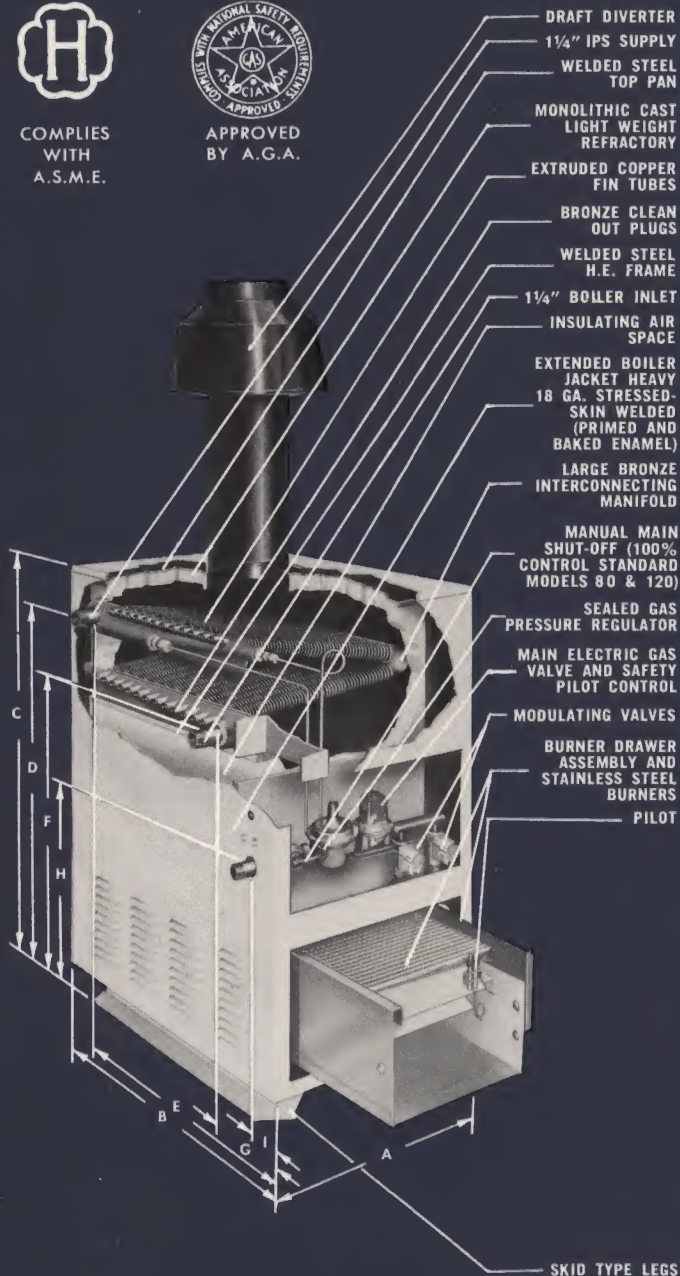
# Raypak



COMPLIES  
WITH  
A.S.M.E.



APPROVED  
BY A.G.A.



## FEATURES AND SPECIFICATIONS

### MODULATING GAS VALVE

This control, exclusive with Raypak, throttles the fuel according to boiler water temperature. This throttling action is combined with a complete shut-off or a combination of two valves. This feature eliminates full-on and full-off inefficient cycling and provides the exact water temperature control necessary for top performance of the heating system. Raypak provides the quiet boiler operation required for today's compact planning.

### 100% COPPER WATERWAYS

Raypak's copper waterways and cast bronze headers cannot rust, corrode, or support internal electrolysis — will last indefinitely.

### HEAT EXCHANGER CLEANOUT PLUGS

The tapered bronze inlet and outlet manifolds of the heat exchanger are equipped with easily accessible cleanout plugs for each tube. This feature provides fast on-the-job cleaning at a minimum cost.

### STAINLESS STEEL BURNERS

Exclusive! Only Raypak provides lifetime, indestructible stainless steel burners of advanced design. They are whisper quiet — inaudible on ignition or extinction. These high performance burners will assure the permanent maximum heating efficiency you expect from Raypak.

### BURNER DRAWER

Exclusive! The stainless steel burners are mounted on a drawer which slides out on rails making it easily accessible.

### MINIMUM WATER STORAGE

This forced circulation type boiler contains very little water, thus fires only on demand from the room thermostat, saving fuel over boilers which contain a large water volume and must be fired frequently, when not needed for heating, just to satisfy standby losses.

### UNIQUE HEAT TRANSFER

Far excelling the ordinary pressed on and bonded fin, the integral copper fin tube exchanger in Raypak boilers is designed for maximum heat transfer providing 80% AGA rated boiler thermal efficiency as opposed to 70% AGA rated water heater thermal efficiency. Raypaks are manufactured to and exceed ASME Boiler standards and comply with the ASME Code.

### LIGHT, COMPACT

Raypak features lightness and compactness, ease of installation and simplicity in piping hookup. In fact, Raypak delivers three times the BTU's per pound of weight. These units require less floor space, too.

### WELL INSULATED

Exclusive! Heavy wall monolithic cast insulating refractory of the combustion chamber assures maximum full fuel efficiency through low radiation loss. This strong, light weight combustion chamber separated by additional insulating air space cannot rust or corrode — will last indefinitely.

### BALANCED WATER FLOW

Exclusive! Scientifically designed heat exchanger with its tapered bronze headers provides perfect hydraulics and balanced water flow in each tube. This equalizes water temperature in each tube.

### HEAT EXCHANGE MANIFOLD

Large bronze header with scientific "water-foil" interconnects the two banks of fin tubes, prevents cavitation (bubbling), hot spots and noisy thermal shock.

### FIRE TESTED

Every Raypak boiler is 100% factory fire-tested to check all controls, test combustion and to assure a leak-proof efficient operation.

### STRENGTH AND SAFETY

The small diameter tubular waterways provide enormous strength, cannot blow out.

## SPECIFICATIONS

| Model | Input Rating<br>Thousands<br>BTU |               | Output Rating<br>Thousands<br>BTU |               | EDR in Sq. Ft. 150 BTU | "A" Width, Inches | "B" Depth, Inches | "C" Height, Inches | Hot Water<br>Outlet     |                         | Cold Water<br>Inlet     |                         | Gas<br>Supply           |                         | Gas Connection | Water Connection | Vent Size Inches | TRIPLE<br>THE BTU'S PER<br>POUND OF WEIGHT |             |
|-------|----------------------------------|---------------|-----------------------------------|---------------|------------------------|-------------------|-------------------|--------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|-------------------------|----------------|------------------|------------------|--|-------------|
|       | Nat. & Mixed                     | LPG (Propane) | Nat. & Mixed                      | LPG (Propane) |                        |                   |                   |                    | "D" Off Floor<br>Inches | "E" Off Front<br>Inches | "F" Off Floor<br>Inches | "G" Off Front<br>Inches | "H" Off Floor<br>Inches | "I" Off Front<br>Inches |                |                  |                  | Model<br>T                                 | Model<br>TP |
| 80    | 80                               | 80            | 64                                | 64            | 425                    | 20 1/2            | 13                | 35                 | 32                      | 2 1/2                   | 26 1/2                  | 10                      | 14                      | 2 1/2 *                 | 1/2"           | 1 1/4"           | 4                | 150  | 205         |
| 120   | 120                              | 120           | 96                                | 96            | 642                    | 21 1/2            | 15 1/2            | 38 1/2             | 34                      | 3                       | 28                      | 12                      | 15 1/2                  | 2 1/2 *                 | 3/4"           | 1 1/4"           | 5                | 165  | 220         |
| 160   | 160                              | 160           | 128                               | 128           | 853                    | 22                | 21 1/2            | 43                 | 37                      | 7                       | 31                      | 18                      | 21 1/2                  | 3                       | 3/4"           | 1 1/4"           | 6                | 220  | 275         |
| 225   | 225                              | 225           | 180                               | 180           | 1200                   | 22                | 25                | 43 1/2             | 38                      | 8                       | 31                      | 21 1/2                  | 21 1/2                  | 2 1/2                   | 3/4"           | 1 1/4"           | 7                | 250  | 305         |
| 400   | 400                              | 400           | 320                               | 320           | 2133                   | 22 1/2            | 35                | 44 1/2             | 38                      | 10                      | 32                      | 30 1/2                  | 17 1/2                  | 3                       | 1"             | 1 1/4"           | 8                | 400  | 475         |
| 600   | 600                              | 600           | 480                               | 480           | 3200                   | 41 1/2            | 31                | 41                 | 42                      | 5                       | 31                      | 5                       | 20                      | 4 1/2                   | 1 1/2"         | 2"               | 10               | 450  | 550         |

\*80 AND 120 CONTROLS FLUSH MOUNTED  
DIMENSIONS ARE DISTANCES FROM C/L OF MANIFOLD TO JACKET FRONT



# Raypak

## -T MODELS

MODELS 80, 120 -T

MODELS 160, 225, 400, 600 -T

### DESCRIPTION OF RAYPAK MODEL T BOILERS

'T' Model Raypak Hot Water Boilers are of standard forced circulation type and are used for hot water central heating, volume hot water supply, and as a sanitizing 180° rinse water booster for commercial dishwashers and various industrial applications. Raypak's exclusive modulating gas valves are an extremely important feature in all of the above applications. The chart on the cover illustrates a typical water temperature curve possible only with Raypak gas modulation. This control system takes over after initial full firing by the electric gas valve. It performs a dual function by serving as a positive high limit control with low flame on-off firing. Gas modulation eliminates the noise of conventional full on-off operation. It provides exact, constant water temperature control, better heating, maximum fuel economy and uniform heat output. In other words, it sizes the boiler for the job and simplifies zoning.

## -TP MODELS

### DESCRIPTION OF RAYPAK MODEL TP BOILERS

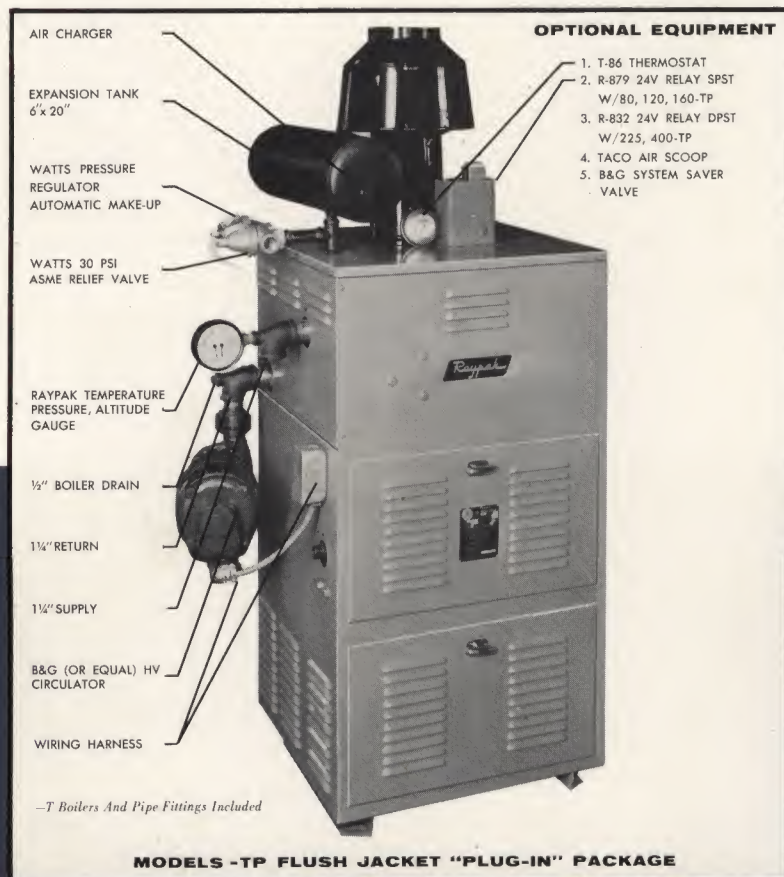
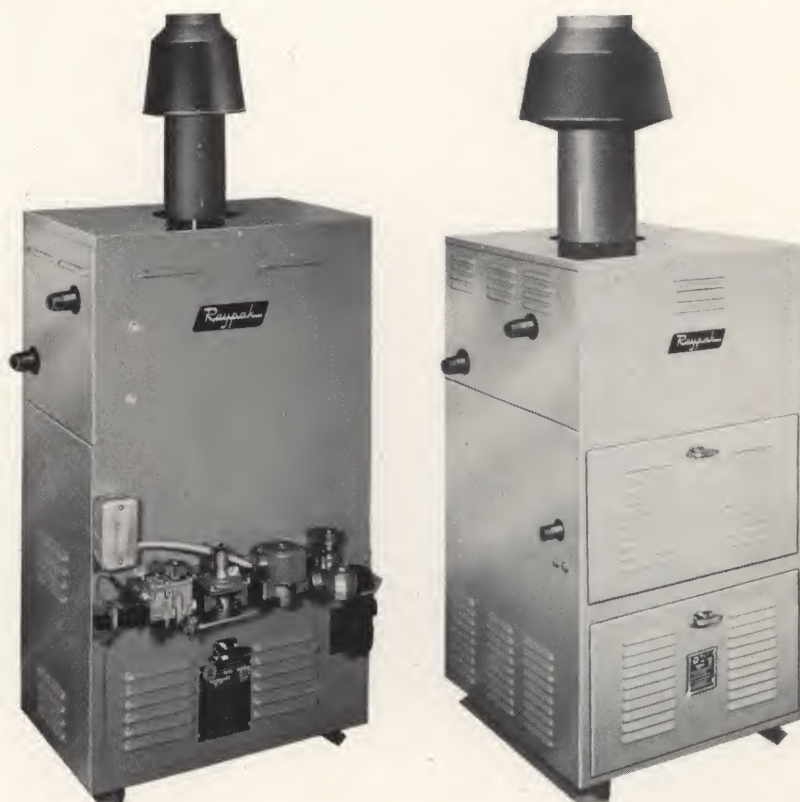
The TP Model Raypak Hot Water Boilers are simply "T" Model Boilers completely equipped and packaged for immediate plug in. These boilers are designed primarily for central hot water heating applications.

The TP Models are standard with high head circulator, expansion tank with air charger plug, ASME relief valve, automatic make-up regulator, boiler drain, wiring harness, temperature-pressure-altitude gauge and transformer relay where applicable. The Model "TP" Raypak boilers are furnished flush jacketed (externally mounted accessories) for ready accessibility.

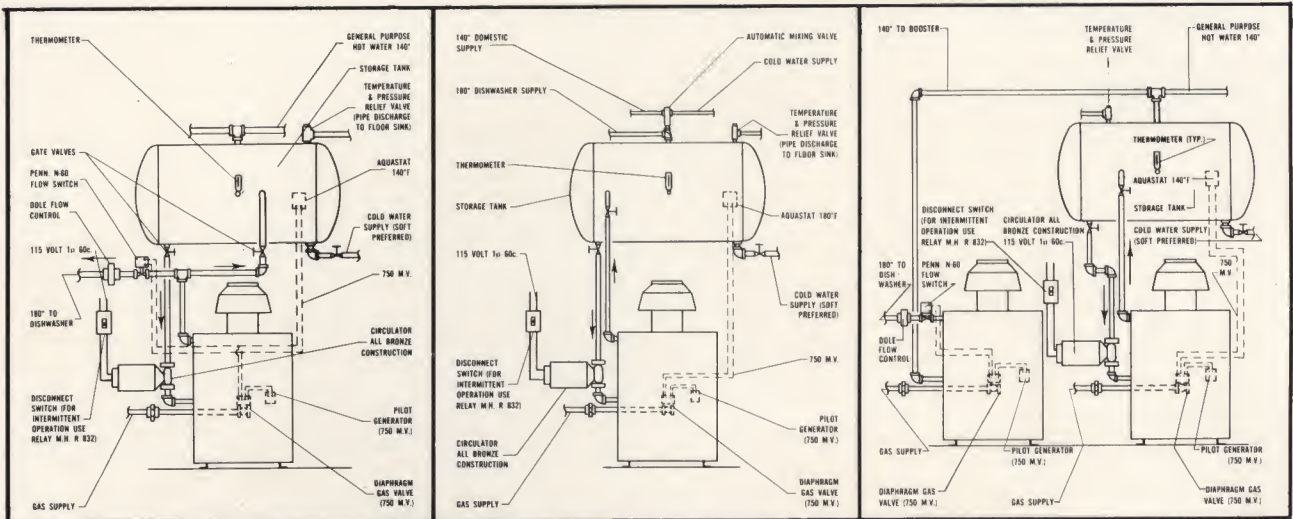
These boilers are completely piped, wired and are a variation of the plug-in design original with Raypak. The Model TP Raypak Boilers are widely used because definite installation labor savings and the savings gained in purchasing and material control.

Each of these units is fire tested and 100% inspected eliminating the "left at the shop" accessories common to other boiler installations.

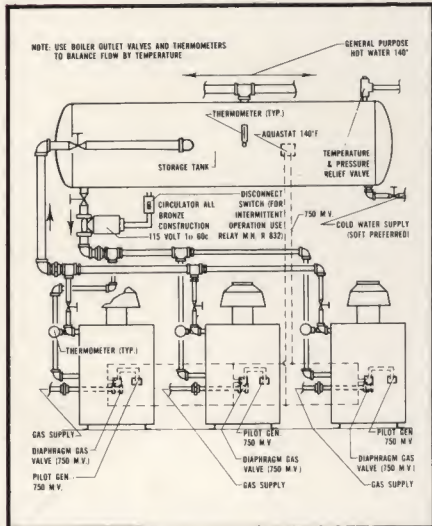
Contractors installing the Raypak TP' Boilers know that the cost of installation can be calculated with an absolute minimum of errors due to the completeness and soundness of the package unit.



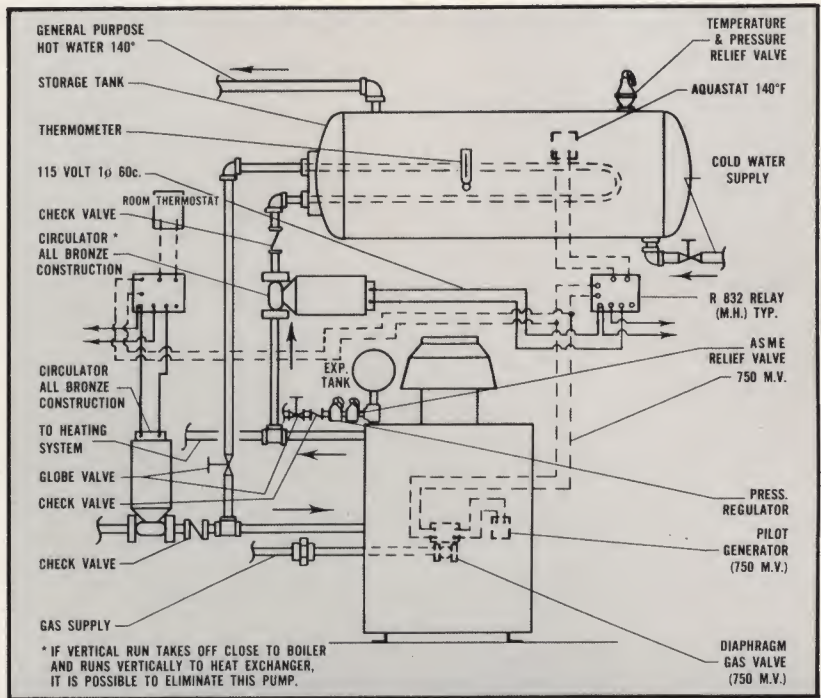




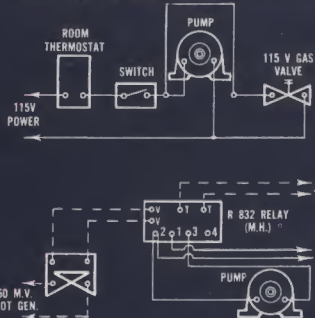
### VOLUME SUPPLY HOOK-UPS



### COMBINATION HEATING SYSTEM AND HOT WATER SUPPLY-SINGLE BOILER

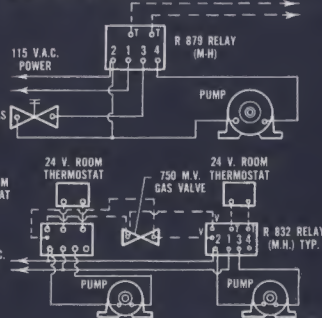


WIRING DIAGRAM FOR MODELS 80, 120 & 160, T & TP  
SINGLE ZONE LINE VOLTAGE CONTROL



WIRING DIAGRAM FOR MODELS 225, 400 & 600, T & TP  
SINGLE ZONE HEATING

WIRING DIAGRAM FOR MODELS 80, 120, & 160, T & TP  
SINGLE ZONE, 24 VOLT CONTROL



WIRING DIAGRAM FOR MODELS 225, 400 & 600, T & TP  
MULTIPLE ZONE, 24 VOLT CONTROL (TYPICAL)

### ELECTRICAL SPECIFICATIONS

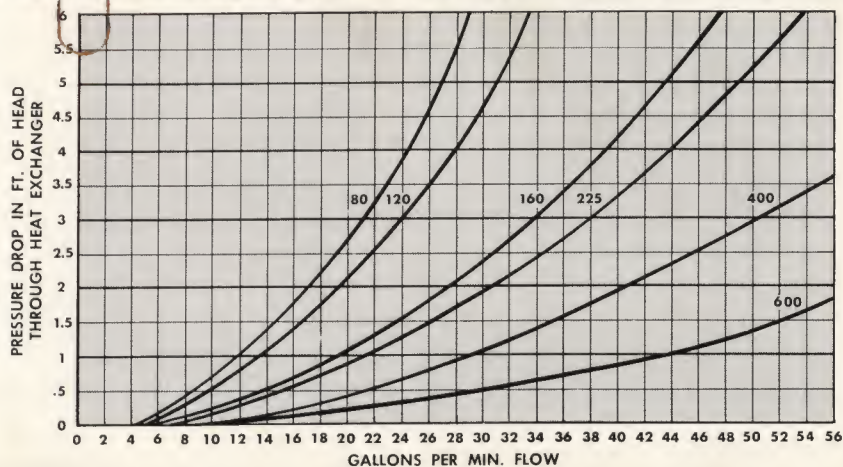
| ELECTRIC GAS VALVE VOLTAGE (STANDARD)        |       |       |       |       |       |
|--|-------|-------|-------|-------|-------|
| 80-T   | 120-T | 160-T | 225-T | 400-T | 600-T |
| 115V   | 115V  | 115V  | 750MV | 750MV | 750MV |
| TYPE RELAY FOR 24V CONTROL                   |       |       |       |       |       |
| SPST   | SPST  | SPST  | DPST  | DPST  | DPST  |
| (OTHER VOLTAGES AVAILABLE AS OPTIONAL EXTRA) |       |       |       |       |       |



# USEFUL DATA

## PRESSURE DROP CHART RAYPAK HEAT EXCHANGERS

THIS CHART APPLIES TO PUMP HEAD DESIGN IN HEATING SYSTEMS.



### COMMERCIAL DISHWASHER FLOW RATES, RECOMMENDED BOILER SIZE AND FLOW CONTROL.

| MANUFACTURER | MODEL                                 | RINSEWATER<br>RATE G.P.M. | RAYPAK<br>BOILER<br>MODEL | G.P.M. 40°<br>TEMP. RISE<br>RAYPAK<br>BOILER | DOLE<br>FLOW<br>CONTROL<br>MODEL |
|--------------|---------------------------------------|---------------------------|---------------------------|--|----------------------------------|
| BLAKESLEE    | B, BC, BT<br>BCT                      | 1.1                       | 80-T                      | 3.2  | 1G                               |
|              | GW5                                   | 1.2                       | 80-T                      | 3.2  | 1½G                              |
|              | D, DC, DT<br>DCT                      | 1.75                      | 80-T                      | 3.2  | 2G                               |
|              | EC, MC                                | 7.7                       | 225-T                     | 9.0  | 8G                               |
|              | PC, SC, WC<br>PT                      | 5.2                       | 160-T                     | 6.4  | 6G                               |
| INSINGER     | ENSIGN                                | 1.3                       | 80-T                      | 3.2  | 1½G                              |
|              | COMMODORE                             | 2.1                       | 80-T                      | 3.2  | 2G                               |
|              | ADMIRAL                               | 6.0                       | 160-T                     | 6.4  | 6G                               |
|              | SPEEDER<br>CLIPPER<br>SUPER<br>MASTER | 5.0                       | 160-T                     | 6.4  | 5G                               |
| UNIVERSAL    | WG, GW2<br>DG, C, B<br>W              | .5                        | 80-T                      | 3.2  | ½G                               |
|              | M, E, U, S                            | 1.0                       | 80-T                      | 3.2  | 1G                               |
|              | D, H, HDC<br>HD                       | .83                       | 80-T                      | 3.2  | 1G                               |
|              | HL, HC                                | .75                       | 80-T                      | 3.2  | ¾G                               |
|              | Y, J                                  | 1.67                      | 80-T                      | 3.2  | 2G                               |
|              | MM, MM3                               | 2.1                       | 80-T                      | 3.2  | 2G                               |
|              | N, N3                                 | 2.5                       | 80-T                      | 3.2  | 2½G                              |
|              | A, A2<br>A3                           | 3.3                       | 120-T                     | 4.8  | 3½G                              |
|              | A4                                    | 4.2                       | 120-T                     | 4.8  | 4G                               |
| CHAMPION     | T                                     | 1.27                      | 80-T                      | 3.2  | 1½G                              |
|              | I-SD<br>I-AT                          | 1.67                      | 80-T                      | 3.2  | 2G                               |
|              | 20-60J                                | 7.5                       | 225-T                     | 9.0  | 8G                               |
|              | 400-600J                              | 6.5                       | 160-T                     | 6.4  | 7G                               |
|              | UC                                    | 5.4                       | 160-T                     | 6.4  | 6G                               |

| MANUFACTURER       | MODEL                       | RINSEWATER<br>RATE G.P.M. | RAYPAK<br>BOILER<br>MODEL | G.P.M. 40°<br>TEMP. RISE<br>RAYPAK<br>BOILER | DOLE<br>FLOW<br>CONTROL<br>MODEL |
|--------------------|-----------------------------|---------------------------|---------------------------|--|----------------------------------|
| HOBART             | UM, LM<br>BW                | 1.2                       | 80-T                      | 3.2  | 1½G                              |
|                    | SM 5                        | .89                       | 80-T                      | 3.2  | 1G                               |
|                    | AM                          | 1.65                      | 80-T                      | 3.2  | 2G                               |
|                    | XM, CM<br>WS                | 7.5                       | 225-T                     | 9.0  | 8G                               |
|                    | GM, XXM<br>CMPC             | 4.5                       | 120-T                     | 4.8  | 5G                               |
|                    | PC                          | 7                         | 225-T                     | 9.0  | 7G                               |
|                    | FT                          | 6.5                       | 160-T                     | 6.4  | 7G                               |
| COLT               | CU, R-16                    | 1.05                      | 80-T                      | 3.2  | 1G                               |
|                    | R-14<br>R-14T               | 1.25                      | 80-T                      | 3.2  | 1½G                              |
|                    | RC                          | 5.85                      | 160-T                     | 6.4  | 6G                               |
|                    | R                           | 4.0                       | 120-T                     | 4.8  | 4G                               |
|                    | C-22<br>C-3                 | 6.0                       | 160-T                     | 6.4  | 6G                               |
| TOLEDO<br>STERLING | CM-CA                       | .8                        | 80-T                      | 3.2  | 1G                               |
|                    | DS, DC<br>TA, TAC           | 1.63                      | 80-T                      | 3.2  | 2G                               |
|                    | CTA, C2<br>2T               | 7.6                       | 225-T                     | 9.0  | 8G                               |
|                    | 2T-60<br>2A, 3T             | 5.3                       | 160-T                     | 6.4  | 6G                               |
| STERO              | SF-1<br>SF-2                | 1.28                      | 80-T                      | 3.2  | 1½G                              |
|                    | SD-1                        | 1.62                      | 80-T                      | 3.2  | 2G                               |
|                    | SCT-44<br>SCT-54            | 6.3                       | 160-T                     | 6.4  | 7G                               |
|                    | SCT-64<br>SCT-76<br>SCT-108 | 4.1                       | 120-T                     | 4.8  | 4G                               |
|                    | SCT-P                       | 4.8                       | 120-T                     | 4.8  | 5G                               |

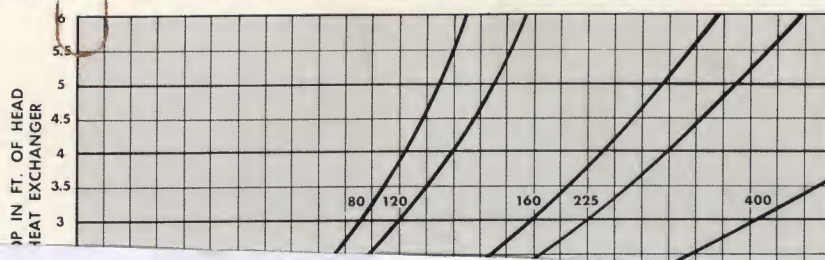
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RAYPAK HEAT EXCHANGERS**

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| I-AT     | 100 | 200   | 300 | 400 |
|----------|-----|-------|-----|-----|
| 20-60J   | 7.5 | 225-T | 9.0 | 8G  |
| 400-600J | 6.5 | 160-T | 6.4 | 7G  |
| UC       | 5.4 | 160-T | 6.4 | 6G  |

| SCT-64 | SCT-76 | SCT-108 | SCT-P | 4.1 | 120-T | 4.8 | 4G | 5G |
|--------|--------|---------|-------|-----|-------|-----|----|----|
|        |        |         |       | 4.8 | 120-T | 4.8 |    |    |

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